

CLAIMS

What is claimed is:

1. A method in a data processing system of associating a mapping function with a configuration construct of a digital design defined by one or more hardware description language (HDL) files, said method comprising:

in an HDL statement within one of one or more HDL files representing a digital design, specifying a configuration latch within a design entity forming at least a portion of the digital design;

in the one or more HDL files, specifying a Dial defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values;

in the one or more HDL files, including a statement that instantiates an instance of said Dial in association with said configuration latch such that a one-to-one correspondence exists between a value contained within said configuration latch and an input value of said instance of said Dial; and

in the one or more HDL files, including a statement associating the Dial with a mapping function that applies a selected transformation to values read from or written to said instance of said Dial.

2. The method of Claim 1, wherein including a statement associating the Dial with a mapping function comprises including a statement associating the Dial with a mathematical transformation.

3. The method of Claim 1, wherein including a statement associating the Dial with a mapping function comprises including a statement associating the Dial with a transformation that shifts a value to which said mapping function is applied.

4. The method of Claim 1, wherein specifying a Dial comprises specifying an Integer Dial (IDial) for which said plurality of input values are integer values.
5. The method of Claim 3, wherein said mapping function comprises generation of a pseudo-random integer value.
6. The method of Claim 1, wherein said Dial comprises a read-only Dial.
7. A method in a data processing system of creating an association between a configuration construct and a mapping function, said method comprising:
  - receiving one or more design intermediate files representing a digital design, said one or more design intermediate files specifying a configuration latch within said digital design and including:
    - a Dial specification statement defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values;
    - a Dial instantiation statement instantiating an instance of said Dial in association with said configuration latch such that a one-to-one correspondence exists between a value contained within said configuration latch and an input value of said instance of said Dial; and
    - a statement associating a mapping function with the Dial such that a selected transformation is applied to values read from or written to said instance of said Dial; and
  - in response to receiving said one or more design intermediate files, creating at least one entry in a configuration database representing said association between said Dial and said mapping function.

8. The method of Claim 7, wherein creating said entry comprises creating an indication of a storage location of a file containing said mapping function.

9. A method in a data processing system of setting a value of a configuration latch in a design entity of a digital system, said method comprising:

in response to receiving an input value for an instantiation of a Dial, said Dial defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values, accessing a configuration database to determine whether said Dial has an associated mapping function;

in response to a determination that said Dial has an associated mapping function, accessing said mapping function by reference to said configuration database to apply said mapping function to a value derived from said input value to obtain a transformed value; and utilizing said transformed value to set said configuration latch.

10. The method of Claim 9, wherein said Dial has a mapping table defining said relationship between each of said plurality of input values and a said plurality of different output values, and said method further comprises obtaining said value derived from said input value by reference to said mapping table of said Dial.

11. A data processing system, comprising:

processing resources; and

data storage coupled to said processing resources and including an electronic computer-aided design (ECAD) tool executable by said processing resources, said ECAD tool including:

means for specifying, in an HDL statement within one or more HDL files representing a digital design, a configuration latch within a design entity forming at least a portion of the digital design;

means for specifying, in the one or more HDL files, a Dial defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values;

means for including, within the one or more HDL files, a statement instantiating instance of said Dial in association with said configuration latch such that a one-to-one correspondence exists between a value contained within said configuration latch and an input value of said instance of said Dial; and

means for including, within the one or more HDL files, a statement associating the Dial with a mapping function that applies a selected transformation to values read from or written to said instance of said Dial.

12. The data processing system of Claim 11, wherein said means for including a statement associating the Dial with a mapping function comprises means for including a statement associating the Dial with a mathematical transformation.

13. The data processing system of Claim 11, wherein said means for including a statement associating the Dial with a mapping function comprises means for including a statement associating the Dial with a transformation that shifts a value to which said mapping function is applied.

14. The data processing system of Claim 11, wherein said means for specifying a Dial comprises means for specifying an Integer Dial (IDial) for which said plurality of input values are integer values.

15. The data processing system of Claim 14, wherein said mapping function comprises generation of a pseudo-random integer value.

16. The data processing system of Claim 11, wherein said Dial comprises a read-only Dial.
17. A data processing system for creating an association between a configuration construct and a mapping function, said data processing system comprising:
- processing resources; and
  - data storage coupled to said processing resources and including a compiler executable by said processing resources, said compiler including:
    - means for receiving one or more design intermediate files representing a digital design, said one or more design intermediate files specifying a configuration latch within said digital design and including:
      - a Dial specification statement defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values;
      - a Dial instantiation statement instantiating an instance of said Dial in association with said configuration latch such that a one-to-one correspondence exists between a value contained within said configuration latch and an input value of said instance of said Dial; and
      - a statement associating a mapping function with the Dial such that a selected transformation is applied to values read from or written to said instance of said Dial; and
    - means, responsive to receipt of said one or more design intermediate files, for creating at least one entry in a configuration database representing said association between said Dial and said mapping function.

18. The data processing system of Claim 17, wherein said means for creating said entry comprises means for creating an indication of a storage location of a file containing said mapping function.

19. A data processing system, comprising:

processing resources; and

data storage coupled to said processing resources and including a tool executable by said processing resources to configure a digital design including a plurality of design entities and having an associated configuration database representing a configuration of said digital design, said tool including:

means, responsive to receiving an input value for an instantiation of a Dial, said Dial defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values, for accessing the configuration database to determine whether said Dial has an associated mapping function;

means, responsive to a determination that said Dial has an associated mapping function, for accessing said mapping function by reference to said configuration database to apply said mapping function to a value derived from said input value to obtain a transformed value; and

means for utilizing said transformed value to set a value of a configuration latch within one of said plurality of design entities forming said digital design.

20. The data processing system of Claim 19, wherein said Dial has a mapping table defining said relationship between each of said plurality of input values and a said plurality of different output values, and said tool further comprises means for obtaining said value derived from said input value by reference to said mapping table of said Dial.

21. A program product for associating a mapping function with a configuration construct of a digital design defined by one or more hardware description language (HDL) files, said program product comprising a computer usable medium including:

means for specifying, in an HDL statement within one or more HDL files representing a digital design, a configuration latch within a design entity forming at least a portion of the digital design;

means for specifying, in the one or more HDL files, a Dial defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values;

means for including, within the one or more HDL files, a statement instantiating instance of said Dial in association with said configuration latch such that a one-to-one correspondence exists between a value contained within said configuration latch and an input value of said instance of said Dial; and

means for including, within the one or more HDL files, a statement associating the Dial with a mapping function that applies a selected transformation to values read from or written to said instance of said Dial.

22. The program product of Claim 21, wherein said means for including a statement associating the Dial with a mapping function comprises means for including a statement associating the Dial with a mathematical transformation.

23. The program product of Claim 21, wherein said means for including a statement associating the Dial with a mapping function comprises means for including a statement associating the Dial with a transformation that shifts a value to which said mapping function is applied.

24. The program product of Claim 21, wherein said means for specifying a Dial comprises means for specifying an Integer Dial (IDial) for which said plurality of input values are integer values.
25. The program product of Claim 24, wherein said mapping function comprises generation of a pseudo-random integer value.
26. The program product of Claim 21, wherein said Dial comprises a read-only Dial.
27. A program product for creating an association between a configuration construct and a mapping function, said program product including a computer usable medium comprising:
- means for receiving one or more design intermediate files representing a digital design, said one or more design intermediate files specifying a configuration latch within a digital design and including:
    - a Dial specification statement defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values;
    - a Dial instantiation statement instantiating an instance of said Dial in association with said configuration latch such that a one-to-one correspondence exists between a value contained within said configuration latch and an input value of said instance of said Dial; and
    - a statement associating a mapping function with the Dial such that a selected transformation is applied to values read from or written to said instance of said Dial; and
  - means, responsive to receipt of said one or more design intermediate files, for creating at least one entry in a configuration database representing said association between said Dial and said mapping function.



28. The program product of Claim 27, wherein said means for creating said entry comprises means for creating an indication of a storage location of a file containing said mapping function.

29. A program product for setting a value of a configuration latch in a design entity of a digital system, said program product comprising a computer usable medium including:

means, responsive to receiving an input value for an instantiation of a Dial, said Dial defining a relationship between each of a plurality of input values and a respective one of a plurality of different output values, for accessing the configuration database to determine whether said Dial has an associated mapping function;

means, responsive to a determination that said Dial has an associated mapping function, for accessing said mapping function by reference to said configuration database to apply said mapping function to a value derived from said input value to obtain a transformed value; and

means for utilizing said transformed value to set a value of a configuration latch within one of said plurality of design entities forming said digital design.

30. The program product of Claim 29, wherein said Dial has a mapping table defining said relationship between each of said plurality of input values and a said plurality of different output values, and said program product further comprises obtaining said value derived from said input value by reference to said mapping table of said Dial.